N. Meenakshi Sundaram
JGMTDS.

NEW VEERANAM SCHEME - AN APPRISAL

13.3.95

Sewerage Shri Gond.

			1981	1991	2011	2021
Exist						
170 Sq.km	CITY	Pop	3.28	4.03	6.05	7.00
		W.S.y		625 ml	997	1217 ml.
+ 12 Panchayt		Allocation Mgs.		535	(770)	(770+80)
190	AUA + AV cd.	Pop	0.64	0.99	1.87	2.29.
		W/sy			228	
		Allocn	—	150		
117	DUA	Pop	0.31	0.63	0.84	1.04
		W/sy				
Total 1174 Sq.km MMA		Allocatd		—	69.	

Extens

Madras 5.53 lakh.
1901
1981 — 40 lakh.

Study is restricted to 477 Km.

Design Period is 30 years.

Control on (XXXX)

SECOND MADRAS WATER SUPPLY PROJECT - NEW VEERANAM

BACKGROUND:

Present water requirement of Madras city and the metropolitan area have been estimated to be about 1750 million litres per day (Mld). As of now these needs are only partially met from the existing surface sources of Poondi, Cholavaram and Redhills in conjunction with limited ground water resources existing within the areas The estimated total maximum availability from these sources is about 460 mld. There is thus an urgent need to augment the water supply to Madras Metropolitan area. With a view to mitigate critical water shortages, the Government of Tamilnadu (GOT) is carrying out works on an open channel conveyance for bringing water resources of Krishna-Penner basin to Madras City, in collaboration with the neighbouring state of Andhra Pradesh under Telugu Ganga Project. This link is expected to ensure an additional supply of 930 Mld, still leaving a shortfall to the tune of some 360mld. In this context therefore GOT has envisaged the development of an additional source of supply - the Veeranam tank, situated in the South Arcot district, about 230 Km. South of Madras city. This source is expected to yield about 190 Mld.

The previous project in which 180 mld treated water was to be conveyed from Veeranam tank to Madras city was partially executed in the early 70's but was subsequently abandoned. Under that project a raw water pump house near Sethiathope and a full-fledged treatment plant at Vadakkuthu about 20 Km. from Veeranam was constructed.

PROJECT:

The Govt. of Tamilnadu, inG.O.Ms.No.197, MAWS, dt.11.8.93 have accorded administrative approval for implementing the ~~water~~ supply project from Veeranam Lake source, called the "New Veeranam

Project" with the World Bank assistance. The component works contemplated under this project include laying of new pipeline from Veeranam to Madras City, rehabilitating the existing treatment plant at Vadakkuthu (constructed earlier under the previous project) and construction of suitable pump house etc.

Veeranam tank is situated inthe Western half of Chidambaram Taluk, lying South of latitude 11°25' N. This is a shallow tank formed by earthen embankment 16 Km long. Its origin dates back to the great Chola dynasty of the early 11th Century. As envisaged, the tank would act as a balancing reservoir receiving water form the Cauvery river which is supplied primarily by the water released from Mettur reservoir. The conveyance system of Veeranam tank consists of long stretch of river Coleroon originating at the Upper Anicut, upto the Lower Coleroon Anicut (LCA) further an unlined water course called the Vadavar canal, 22km long terminating at Veeranam tank. At present as a part of improving irrigation efficiencies, GOT has undertaken lining of Vadavar canal.

The capacity of Veeranam tank estimated in 1991 is 27.74 Mm^3 (979.4 Mcft) and its water spread area at its full tank level of 13.87 m (45.5 ft) is about 20.83 sq.km in the year 1923 its capacity has been reported to be 40.80 Mm^3 (1441 Mcft), which indicates that tank has silted up considerably over the last 68 years. The tank supplies irrigation water to an adjacent area of 18,153 Ha in the South Arcot district. In addition, the operation rules necessitate Veeranam tank to pass supply to neighbouring Sethiathope Anicut System (SAS) at times of latter's shortfalls. In the context of approving Veeranam tank as a source for drinking water supply to Madras, GOT (vide the Government order (GO)No.1430 of October 1993)

has stipulated monthly irrigation and water supply demands and provides that water supply requirement be treated as an additionality during the irrigation season from July to the subsequent February (8 months period) and for the remaining period (4 months) by keeping the tank full, the requirements of Madras city should be met in full. ~~the requirements of Madras city should be met in full~~. The GO specifically approves raising of full storage level by 0.61 m (2ft) for augmenting the existing capacity in order to meet demands during non-irrigation season.

FEASIBILITY STUDIES:

In order to ensure that Veeranam lakes is a dependable source of water supply to Madras city by which the city supply could be augmented by 180 mld and to arrive at economical alternative pipe sites and material and other component works the following consultancy studies were commissioned by Metrowater.

1. Feasibility study on Veeranam source yield
2. Feasibility study on water transmission, treatment and pumping

Both the consultancies were carried out by M/S. Tata Consulting Engineers, Bombay and completed in time so that further proposals can be formulated.

The feasibility study onsource yield has established the source adequacy and the study on transmission, treatment and pumping has provided the basis for the technical design and economicalternatives. Both the reports have been discussed in

detail by the Board Engineers and the World Bank Mission. The details of the study findings and salient features of the project are indicated inthe subsequent chapter. The recommended scheme is also briefly described.

The final proposal is to be formulated by another consultant assigned to carry out the detailed design & engineers for the transmission main, treatment and pumping.

The Govt. in G.O.(3D) No.52 MA&WS dept. dated 26.12.94 have ordered that Tamilnadu Water Supply & Drainage Board will be solely responsible for the entire water transmission from Veeranam Tank to Madras city including pumping and treatment.

In view of this further works are to be taken up by TWAD Board.

SALIENT FEATURES OF THE PROJECT

The alternative with rehabilitated treatment plant at Vadakuthu and pumping-cum-gravity mains is the least cost solution and it also has a higher reliability. This scheme envisages pumping of raw water from Veeranam tank to the rehabilitated (existing) treatment plant located at Vadakuthu (about 200 Km from Madras) and treated water from this treatment plant is supplied to a receiving tank at porur in Madras city.

Raw Water (190 Mld) will be drawn from the Veeranam Tank through an open in take channel as this facilitates drawal of Water

from lower levels and easy maintenance. The existing raw water intake well and the duct at the raw water intake will be abandoned as this does not permit drawal of water from lower levels and also poses maintenance problems.

The existing treatment plant at Vadakuthu is proposed to be rehabilitated by testing/reparing the civil structures and replacing all mechanical and electrical equipment with new equipment. The treated water output from the plant will be 180 Mld.

Buried steel pipe of 1800 mm x 10mm (for 20 km) 1775mm x 10 mm (for 8 km), 1875 mm x 12 mm (179Km) 1525 mm x 10mm (for 30km) are proposed for transmission main with internal cement mortar lining (12.5 mm thick) and external gunniting (40 mm thick). Diameters indicated are internal diameters of steel pipe before lining. Galvanic sacrificial anode type of cathodic protection is proposed as a back-up to the protective coating on the external pipe surface.

There will be two (2) pumping stations one each at the raw water intake at Sethiathope, and Vadakuthu. At each pumping station, six (6) (4 operating + 2 standby) new horizontal centrifugal pumps are proposed.

From pumping station at Vadakuthu, Water will be pumped to an elevated tank (with bottom elevation of about 10m above ground level) at Kadampuliyur ridge (at a distance of about 8 km from Vadakuthu) from where water will flow by gravity to porur in Madras.

Existing mechanical and electrical equipment both at the raw water intake pumping station at Sethiathope and pumphouse the

at Vadakuthu are not proposed to be rehabilitated/reused except for a few valves and piping. Completely new electrical/mechanical equipment are proposed to be procured. The main reason for this is that existing equipment are 20 years old, have been kept without preserwation and their residual life cannot be readily assessed.

New pumphouse buildings are proposed atboth the Intake and Vadakuthu. Existing pumphouse buildings will be rehabilitated to house the electrical switchgear, MCC and control panels.

At each pumping station, two (2) dedicated power supply feeders taken from two different sub-stations of Tamil Nadu Electricity Board (TNEB) are proposed. Voltage level will be either 33 Kv or 11 Kv depending on the voltage level at the sub-stations.

DESCRIPTION OF RECOMMENDED SCHEME

INTAKE SYSTEM AT SETHIATHOPE

Raw water from the tank is drawn through an open channel. Trashracks at the channel mouth to prevent entry of floating debris and screens inthe pump suctionchamber to arrest entry of matter bigger than 15-20 mm are envisaged. The channel will feed into a forebay from where the pumps take suction.

Six (6)nos. (4 operating + 2 standby) horizontal centrifugal pumps each of 2200 cu.m/hr capacity with a head of about 40 metres, driven by 400 KW 3.3 Kv, 980 RPM, AC electric motors are proposed to pump raw water to the clarifiers at

Vadakuthu. The pumps will be located in a pit adjacent to the forebay so that they get flooded suction and can be operated without need for priming. Horizontal dry pit centrifugal pumps are proposed in preference to vertical wet pit turbine pumps in view of their ease of maintenance. Further, the cost difference between horizontal and vertical pump installation is marginal (Rs. 5 to 10 million per pumping station) in favour of the latter.

Electrical switchagear and the motor control centres will be housed inthe existing pump house building which will be rehabilitated.

Chlorination system to dose chlorine solution to raw water forebay at the inlet of pump suctionpipes will be provided. This consists of 2 X 100 % vacuum type chlorinators each of 40 Kg/hr capacity. Each chlorinator will be connected to 4 nos. chlorine tonne containers. The chlorine cylinders will be located in an area adjacent to the new pumphouse.

TREATMENT PLANT AT VADAKUTHU

The existing treatment plant at Vadakuthu will be rehabilitated and used The existing treatment plant consits of the following major structures:

a) Clarifiers (4 Nos.) with dividing box, parashall flumes and flash mixers (2 Nos.) and sludge pits (4 Nos.)

b) Filter house with an annexe

c) Overhead tank

d) Clear water underground tank.

e) Chemical house, administration and laboratory building.

In addition to the existing facilities , clarifier sludge/ filter backwash water processing/disposal system will be provided. This will consist of sludge thickners where clear water is separated from waste water and returned to clarifier inlet. The concentrated sludge from the sludge thickners will be let to drying beds from where the dry sludge, after the water evaporates, is removed and disposed off manually.

Treated water from the filters will be led to the existing underground treated water storage tank.

The new 415 V switchgear and MCC required for treatment plant will be accommodated in the existing chemical house building.

STORAGE TANK AT VADAKUTHU

The existing underground storage tank of 8000 cu.m. capacity will be utilised. Rehabilitation measures required will be carried out .

PUMPING STATION AT VADAKUTHU

A new pumphouse with dry pit will be provided adjacent to the existing underground clear water storage tank.

Six (6) nos. horizontal centrifugal pumps (4 operating + 2 standby) each of 2100 cu.m/hrcapacity and a total head of about 71 mWC, driven by 600 kw, 3.3. Kv, 980 RPM, AC electric motors will be provided to pump water to an elevated tank at Kadampuliyur.

Electrical switchgear and the motor control centres will be housed inthe existing pumphouse building. The rehabilitation measures needed for the existing pumphouse building and additional works

required for converting it to switchgear & MCC Building will be carried out.

Two (2) nos. 100% capacity vacuum type chlorinators each of 20 Kg/hr capacity will be provided to dose chlorine solution to the water storage tank. Each chlorinator will be connectdd to two (2) nos. chlorine tonne containers. The chlorinators and cylinders will be located in the annex of pump-house.

Treated water from the overhead tank at Kadampuliyur ridge will flow by gravity to the proposed storage tank at porur in Madras.

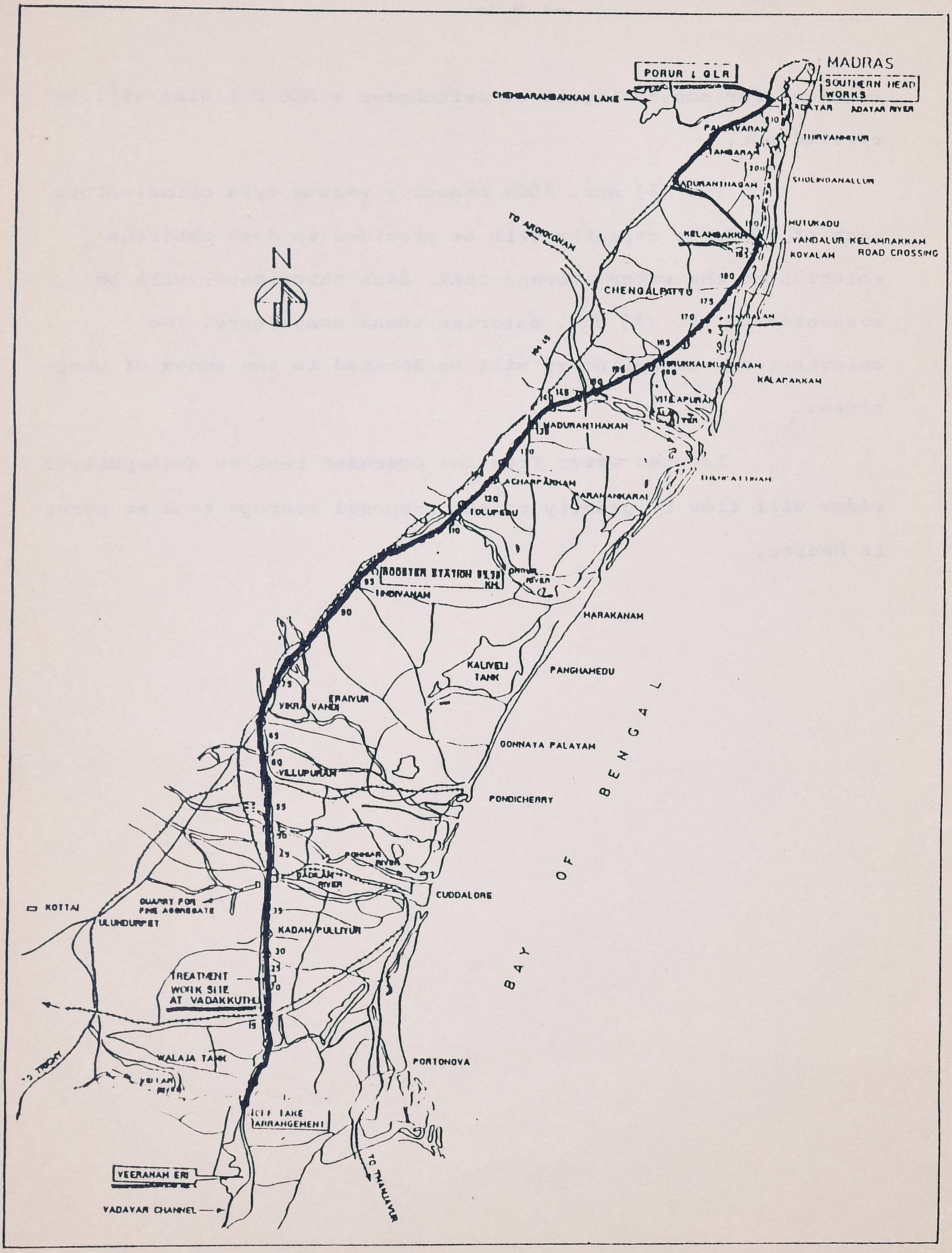

FIG. 1 : INDEX PLAN SHOWING THE PROPOSED ALIGNMENT OF VEERANAM TRANSMISSION PIPELINE

VEERANAM TANK SYSTEM

GENERAL

The Veeranam Tank forms part of Cauvery system in Tamilnadu. It functions as a balancing reservoir, receiving flows from Lower Coleroon Anicut (LCA) through Vadavar canal and supplementing irrigation of a part of Sethiathope anicut command in addition to its own.

CAUVERY BASIN

2. It will be important to understand the Cauvery system in Tamilnadu in order to appreciate the working of Veeranam tank. The Cauvery river rises in the western ghats of Kodagu district of Karnataka and traverses a total distance of about 800 km before joining Bay of Bengal. It drains a total area of about 81,155 sq.km within Tamilnadu. The important tributaries of Cauvery are the Hemavathy, Lakshmana Thirtha and Kabini in Karnataka and Bhavani, Amaravathy and Noyyil in Tamilnadu.

. Downstream of Mettur, the river continues its southward journey and a number of old anicut systems have been put across the river for supplying irrigation water to large tracts before it joins the Bay of Bengal. The Upper anicutts situated 177 km downstream of Mettur near Thiruparaithurai. Grand anicut is situated near Trichy further 35 km downstream, and the LCA situated at Anikerai village, about 320 km downstream of Mettur. The registered ayacut of LCA in Thanjavur and South Arcot districts are as below :

District	Total Area (Ha)
Thanjavur	12,480
South Arcot	40,448

The catchment area above the Karnataka-Tamilnadu border is mainly influenced by the south-west monsoon while the catchment area in Tamilnadu, with the exception of the upper reaches of Bhavani and Amaravathy, is influenced mainly by the North-east monsoon. The Mettur dam is immediately below the inter-state boundary and also between the two distinct rainfall zones.

Mettur Dam

3. The Mettur dam project taken up in 1925 was completed in 1934. The reservoir has a live capacity of 2647 Mm^3 (93,470 Mcft). This reservoir is the major source for all uses in Cauvery basin since none of the anicut systems situated in entire Cauvery basin downstream have sizable pondages. Salient features of Mettur dam have been presented in Annex II-1.

Jeddarpalayam Bed Regulator

4. A bed regulator across Cauvery has been constructed near Jeddarpalayam to serve as the off take of one of many river channels namely Raja Komarapalayam channel taking off from the Cauvery.

Kattalai Scheme

5. A number of channels take off from both sides of Cauvery downstream of Mettur dam. Many of these channels take off from Cauvery with open heads to feed small extents in narrow strips along river course. To remedy the problem of inadequacy of supplies to some of these channels the Kattalai scheme was conceived and completed in 1933. The scheme consists of

i) Bed regulator across Cauvery at Kattalai

ii) South Bank Canal connecting the river channels existing in the vicinity of the right bank of Cauvery

iii) North Bank Canal connecting the river channels existing in the vicinity of the left bank of Cauvery

iv) Kattalai high level channel.

Upper Anicut

6. The river Cauvery below the confluence of Bhavani widens its bed and bifurcates into two large branches at a location 16 km to the west of town of Trichy and this location is considered as the head of Delta. The northern branch is called coleroon and the southern retains the name of Cauvery. To regulate the flows into the branches, Sir Arthur Cotton constructed a weir at the head of the coleroon arm in 1836 which is known as the Upper Anicut. In the year 1845 a grade wall was built across the Cauvery and is known as the Cauvery dam. During the year 1902, modifications were carried out to the weir across coleroon arm by way of lowering of the crest level and installation of lift shutters, to gain increased control over the diversion of river flows. Subsequently in 1977, a barrage across the Cauvery arm has been constructed.

Grand Anicut

7. The two arms of the river Cauvery viz., the Cauvery and the Colerron after bifurcation at Upper Anicut, flow parallel to each other and almost rejoin at about 26 km downstream of Upper Anicut. At this location an anicut was built on the left bank of Cauvery which is known as 'Grand Anicut'. The main function of this anicut is to provide necessary head to draw supply required for the Delta and pass surplus into coleroon. During the 19th century and this century various improvements have been carried out to the original structure. As on date, the Grand anicut comprises of :

i) The Grand anicut proper with lift gates.

ii) A group of scouring sluices

iii) A group of regulators at the heads of Cauvery and Vennar

iv) A regulator at the head of the Grand Anicut canal.

Lower Coleroon Anicut

8. The Lower Coleroon Anicut (LCA) has been constructed across the river Coleroon about 112 km below the Grand Anicut. The Coleroon branching off on the left of Cauvery at the Upper Anicut site is the natural carrier of flood flows of Cauvery. In the lower reach, it caters to irrigation through the North Rajan, South Rajan, Kummukkimanniar and Vadavar Canal Systems. Vadavar feeds the Veeranam tank and Sethiathope Anicut System. The total area commanded by LCA is about 52928 Ha, out of which Vadavar canal accounts for 24517 Ha. Prior to 1836, there were no regulation or diversion works at the Upper or Lower Anicut sites. There were sufficiently large flows in Coleroon to feed the channels taking off on both sides for direct irrigation and during freshets Veeranam tank was filled through Vadavar and the storage in the tank served to protect the irrigation under it during periods of low supply. With the construction of the Upper Anicut in 1836 flows in Coleroon diminished as the Cauvery arm started drawing more. To ensure adequate supply to the areas dependent on Coleroon the LCA was constructed during the same year. The anicut consists of two branches with an island of about 365.76 m (1200 ft) in between. North Rajan Channel was dug to irrigate lands previously served by four separate canals taking off from the left bank of Coleroon.

Remodelling and Improvements Works of LCA

9. The anicut was heavily damaged by floods in 1856 and reconstructed. There were also some damages in 1865 floods and these were made good. During 1899 to 1903 deep retaining walls were provided in front and rear. The body wall of the Anicut which was on the downstream side of the bridge was cut down and a new body wall with crest 4 ft. lower than the old body wall was built on the upstream side of the bridge and crest gates of size 9.14 m x 1.83 m (30ft x 6ft) were installed. This was done mainly to enable Vadavar canal which feeds Veeranam tank to draw its full supply. During 1907-1909 the crest of the Anicut was further lowered by 0.61 m (2 ft) and the height of shutters increased from 1.83 m (6 ft) to 2.44 m (8 ft). This enabled passing down larger volumes of water during flood. After the record floods of 1924 (4.75 lakhs cusecs) the need for increasing the flood discharging capacity of the Lower Coleroon Anicut was realised. 10 vents were added to south branch of the anicut, 8 on the northern end and 2 on the southern end to pass a total flood of 4.75

lakh cusecs. The work was completed in 1928. In the year 1953 the height of shutters was increased by 0.3 m to push down requisite supply in Vadavar canal. Salient features of this anicut which is now the last diversion structure in the Cauvery basin have been presented in Annex II-1 referred earlier.

VEERANAM TANK

10. Veeranam tank has been an ageold source of irrigation to large ayacut situated in the South Arcot district. A part of Mettur resources received by it have to be transferred to the neighboring Sethiathope Anicut System (SAS) to sustain its own large ayacut. The bund has been formed by a low height main (3 to 4 m) earthen dam nearly 16 km long and a foreshore bund, 9 km long. It has a catchment area of 427.5 sq.km. The ayacut under the tank is 18153 Ha. Its present storage capacity of 979.4 Mm^3 is very small in relation to its ayacut. The maximum supplementry supplying to SAS, which has its own large ayacut has been restricted to 116 Mm^3 (4100 Mcft) per annum. The irrigation season is spread over period from 21st June to end of February, during which a main crop of Paddy (Samba) starting from August to January & subsidiary crops (Thaladi & Kuruvai) in shorter spells from July to October & from October to January are planned. The demand for irrigation water is therefore seasonal, guided by crop water requirements during any week. The present 34 nos. of irrigation sluices in the main and foreshore bunds are operated by the Executive Engineer, Chidambaram division with due regards to availability and requirement of water.

TANK CAPACITY

Present capacity of Veeranam Tank is 27.7 Mm^3 (979.4 Mcft). This capacity has been established based on range survey inducted in 1991 by the Institute of Hydraulics and Hydrology, Poondi. The water spread of the tank is 20.832 sq.km as against original capacity of 40.8046 Mm^3 (1441 Mcft) during the year 1923, as recorded in the component register of the tank.

. The total volume of silt deposited over 68 years is 13.061 Mm^3 and accordingly the annual silting load is 0.1921 Mm^3 and the annual rate has been 0.471 percent. The present trap efficiency of Veeranam tank has been assessed as 88.4%, showing a marked decline in silt accumulation over the years.

CONVEYANCE SYSTEM

1. The conveyance system downstream of Mettur has been presented schematically in Fig II-2. Vadavar canal is one of the most important elements and as it exists is an unlined water course. Vadavar takes off from Coleroon river on its left bank and from its headworks flows eastwards for a length of 22 km before terminating at the Veeranam tank. Vadavar is the major source of supply to Veeranam tank. Under the existing arrangements the canal feeds its own command area of some 4740 Ha in the south Arcot district and such releases are effected through its 24 nos. of bed level outlets. The canal has varying cross sections along its route and had very flat slope of 1 in 10,000. A feature of this canal is the number of streams inflowing at various locations, the most important of them being the Karavattu Odai. This drain accounts for nearly 10% of Veeranam catchment and has been reported to carry large flood runoffs. As at present Vadavar is heavily silted up and as a result the carrying capacities viz., design maximum of 64 m^3/sec (2200 cusecs) is understood to have been reduced by as much as 30%. At present the Irrigation Department (ID) is carrying out current meter measurements for establishing its carrying capacity and have been contemplating the following elaborate restoration works:

desilting and providing lining to the canal as per standards as follows:

- I-reach 0.00 km to 4.8 km section channel width: 36.6 m, full supply depth: 2.56 m, bed slope: 1/14,500, Side Slope: 1.5:1.

- II-reach 4.8 km to 22 km section channel width: 30.0 m, full supply depth : 2.505 m, bed slope 1/14,500, Side Slope: 1.5:1.

- Starting Bed level at Ch 0.00 has been proposed to be 13.5000 m considering the bed slope to be provided, the lowest level of channel at the Veeranam end would be 11.982 m.

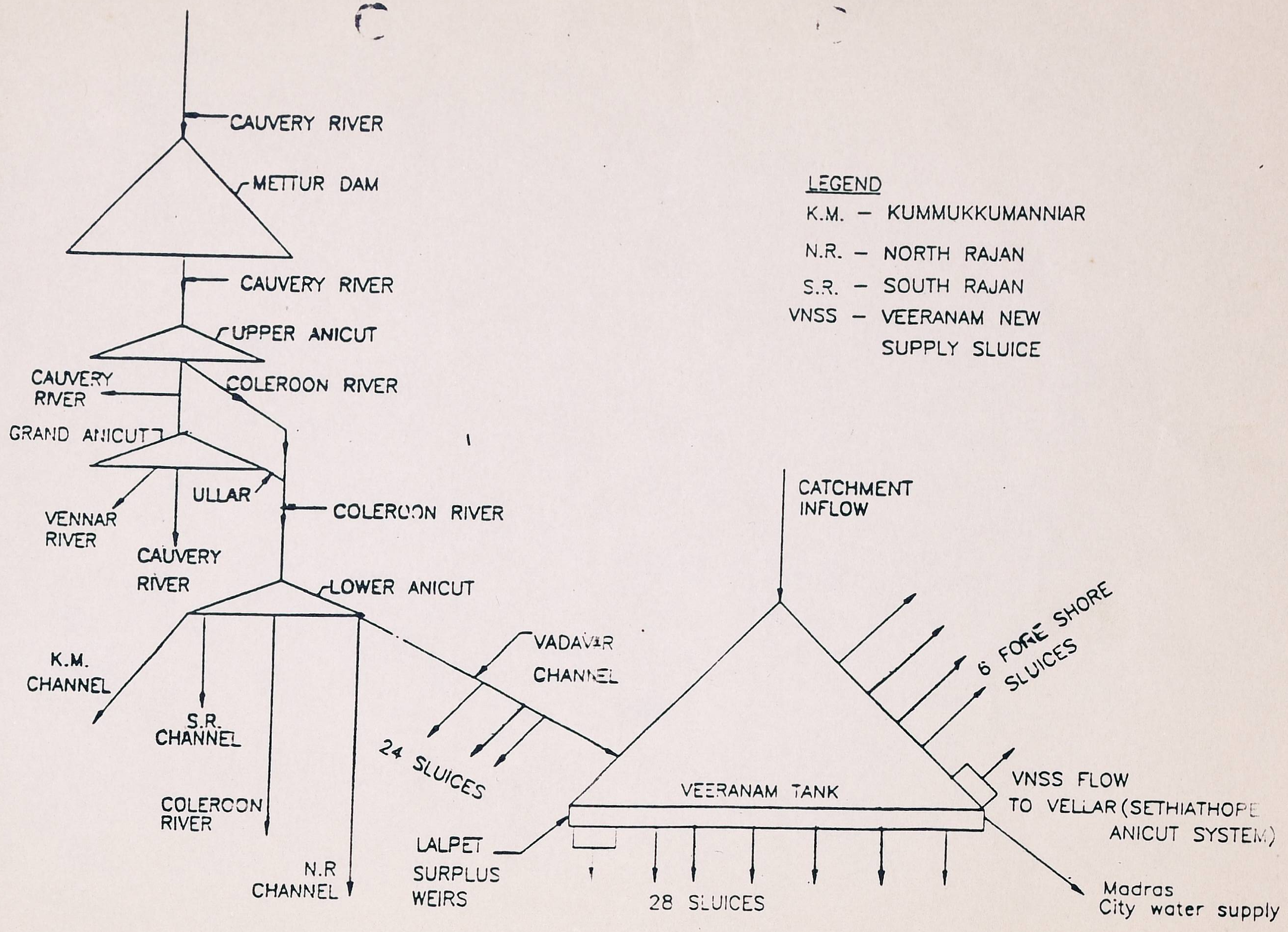

FIG.II-2 SCHEMATIC OF VEERANAM TANK CONVEYANCE SYSTEM

KRISHNA WATER SUPPLY AUGMENTATION PROPOSALS

KRISHNA WATER SUPPLY PROJECT

1.0 CITY WATER SUPPLY SYSTEM

Water required for the Madras City is now drawn from a chain of three lakes viz.Poondi, Cholavaram and Redhills which receive supply from the Kortalaiyar river. This river is usually in floods for a few days only in the months of Oct. to Dec. during the north-east monsoon period. The dependable yield from this river is around 200mld. In addition to this there are six well fields viz. Tamaraipakkam, Panjetty, Minjur, flood plains, Kannigaipar and Poondi on the northern periphery of the city, from which 50 MLD ground water is extracted to feed the Industries and also to supplement the city water supply system. As the supply of 250 MLD is far below the demand, the need for additional quantity of water from external sources had to be sought for.

2.0 KRISHNA WATER SUPPLY PROJECT

An agreement was signed by Maharashtra, Karnataka and Andhra Pradesh states with the Tamilnadu on April 14th 1976 for sparing 15 Thousand million cubic feet (TMC) of water per annum from Krishna river water (each state sparing 5 TMC of water) to meet the requirement of Madras city water supply. An agreement was concluded between the Chief Ministers of Andhra Pradesh and Tamilnadu on April 18th 1983 for the implementation of the project namely the Krishna water supply project to transmit 15 TMC of Krishna water in a year from

Srisailam reservoir to Tamilnadu border in open canal along with irrigation requirement of places enroute in Andhra Pradesh state. The construction of the project is termed as Telugu Ganga Project by Andhra Pradesh Govt. The length of the Telugu Ganga canal will be of 404 kms. starting from Srisailam reservoir and will have the following major components in addition to the main canal.

1) Bankcherla regulator complex
2) Velugodu reservoir
3) Somaseela II stage and
4) Kandaleru reservoir

3.0 QUANTITY OF WATER

The Andhra Pradesh Govt. as per the agreement will have to supply 12 TMC of water (15 TMC - 3 TMC transmission losses) at Tamilnadu border. This quantity will be drawn over a period of 8 months in a year ie. 8 TMC during the 4 months from July to October and 4 TMC during 4 months from January to April. As a first stage of implemenation it is proposed to draw 5 TMC of water (400 mld) and the remaining 7 TMC (530 mld) will be drawn in II stage.

4.0 KRISHNA WATER SUPPLY CANAL-TAMILNADU PORTION

Krishna water to be received in the I stage at the Tamilnadu border (400mld) will be conveyed through open canal to the existing Poondi, Redhills and Chembarambakkam reservoirs. In order to receive this additional quantity of

water, the full tank level (FTL) of these three reservoirs are being raised by an height of 0.6 mtrs. By raising FTL, the additional capacity to be created will be 47.6 m.cube (1682 mcft). The additional quantity expected by the II stage (530 mld) were proposed to be accomodated by creating additional reservoirs at Ramanancheri, upstream of Poondi and at Thirukandalam down stream of Tamaraipakkam anicut. A canal with a capacity of 1000 cuses is constructed for a length of 25 km. from Tamilnadu border to Poondi reservoir to convey Krishna water to Poondi reservoir. Another canal of 1000 cusecs capacity is being constructed for a length of 24.5 km. from Poondi reservoir to draw the Krishna water to Chembarambakkam lake. From this canal a branch canal with a capacity of 500 cusecs is constructed to convey Krishna water to Redhills lake. The portion of works covered within Tamilnadu Border is termed as Krishna Water Supply project.

6.0 FUNDING AGENCY

All the works in Andhra Pradesh are carried out by the Irrigation Department with funds met both by the Andhra Pradesh and Tamilnadu proportionate to design capacity. Canal works including raising of full tank level within Tamilnadu Borders are being carried out by the Tamilnadu PWD with funds provided by Tamilnadu Govt.

6.0 PROJECT COST

The project cost of the Telugu Ganga project within Andhra Pradesh border is Rs.1460 crores as per 91-92 rates. The details of expenditure as received from A.P. Govt. upto the end of NOv.'94 is Rs.797.00 crores.

7.00 TARGET DATE FOR RECEIPT OF 3 TMC OF WATER

During the joint discussion held by the Hon' Chief Ministers of Tamil Nadu and Andhra Pradesh on 27.1.'94 it has been agreed that 3 TMC of Krishna Water will be made available at Tamil Nadu border by Dec.'95.

MADRAS TRANSMISSION DISTRIBUTION SYSTEM - AN APPRISAL

MADRAS TRANSMISSION AND DISTRIBUTION SYSTEM

1.0 INFRASTRUCTURE IMPROVEMENTS WITHIN CITY

In order to receive, treat and distribute the additional water expected from Krishna river, a project has been formulated to improve the water supply and sewage infrastructures within the Madras city via. Transmission and Distribution system (MTDS-Krihsna Water Supply Project). This project envisages 12 individual water supply reservoirs in addition to the 4 existing head works within the city. (List furnished in Annex. I). Further the trunk and feeder mains and also the distribution net work will be replaced or strengthened. It is proposed to provide 7 meter terminal head in the distribution net work. On the sewerage section, it is proposed to strengthen the collection system and also improve the pumping capacities and the treatment facilities.

2.0 ADJACENT URBANISED AREAS:

In addition to the improvements contemplated within the city, this project also envisages provision of treated water supply to 20 Adjacent Urbanised Areas (AUA) (Municipalities, Town panchayats, villages etc) as per the list furnished in Annex II on the periphery of the Madras city which at present do not have the protected water supply system. Further provision of limited sewerage system is also proposed under this project.

3.0 ENVIRONMENTAL SANITATION COMPONENT

As part of the scheme, the improvements on the environmental sanitation components namely low cost sanitation, solid waste disposal, storm water drainage improvements etc. are also included in this project. MMDA will be nodal agency for this component.

4.0 FUNDING OF THE MTDS PROJECT

This project has been posed to the World Bank for funding and pre appraisal of the project was taken up in Oct.'91 and the World Bank had suggested certain modifications like inclusion of the environmental sanitation component etc. This project is now termed as Third Madras Water Supply and Environmental Sanitation Project. The World Bank while pre-appraising the project had required that an Operating Rule for the Krishna canal will have to be formulated and further insisted that the status report on the Resettlement and Rehabilitation (R&R) of the project affected persons of the Telugu Ganga canal(within Andhra Pradesh border) will have to be provided to them. The operational rules have now been formulated by Andhra Pradesh Government and a copy of the same has already been forwarded to World Bank. As regards the status report on R&R activities within Andhra Pradesh a communication has been received recently that the R&R master plan has been prepared by Andhra Pradesh Govt. and submitted to Govt. of India for its review. This information

has already been communicated to World Bank and the bank has been requested to take up the appraisal of the project immediately. In veiw of the fulfilment of all the major pending issues, the appraisal of the Project is expected to be taken up by the bank shortly.

In view of the anticipated delay in receipt of Krishna Water, the Tamil Nadu government has given approval for the New Veeranam Project to supplement the city water supply. As per the project, 180 mld of water will be conveyed to city from Veeranam lake situated about 220 km south of Madras city.

5.00 ALLOCATION OF WATER

The present per capita water supply of 70 lpcd for the city portion on completion of Krishna Stage I and New Veeranam project will increase to 140 lpcd. The statement showing the allocation of Krishna Phase I, II and New Veeranam water is in Annex III.

6.0 PROJECT COST

The project cost of the Third Madras Water Supply and Environmental Sanitation Project updated in Dec.'94 is Rs.15768 million (city portion + AUAs + environmental sanitation project). The project cost for the works contemplated within the city will be Rs.10536 million . During the pre-appraisal of the New Veeranam project, the bank was requested to include into that project certain components of the improvements to city distribution system namely head works, transmission and distribution works proposed in the Third Madras Water Supply Project. The bank has accepted to provide an amount of Rs.250 crores for the above works under New Veeranam Water Supply Project. To this extent the project cost of Third Madras Project will get reduced.

WASTE WATER UTILISATION AND RELATED O E C F PROJECT PROPOSALS